MASTER OF SCIENCE
IN
METEOROLOGY AND
PHYSICAL OCEANOGRAPHY

COAMPS MODELED SURFACE LAYER REFRACTIVITY AT THE ROUGHNESS AND EVAPORATION DUCT EXPERIMENT 2001

D. Adam Newton-Lieutenant, United States Navy
B.A., University of San Diego, 1995
Master of Science in Meteorology and Physical Oceanography-June 2003
Advisor: Kenneth Davidson, Department of Meteorology
Second Reader: Douglas Miller, Department of Meteorology

A study of the performance of the Coupled Ocean-Atmosphere Mesoscale Prediction System (COAMPS) was performed based on collected METOC properties affecting radar propagation during the Roughness and Evaporation Duct (RED) experiment conducted off the windward coast of Oahu, HI. The measured refractivity influencing parameters (SST, air temperature, humidity, and wind speed) were compared to COAMPS predicted values. Using the NPS bulk evaporation duct model, profiles of the modified refractivity were computed from the buoy data and compared to profiles computed from the COAMPS data. The profiles were obtained concurrently with S-Band propagation measurements along a 26-km path. The radar propagation predictions created by APM from the modified refractivity profiles, derived from the measured METOC values and COAMPS modeled values, were compared to the in situ measured propagation losses. The mean RMS error of the prop loss predictions derived from the COAMPS forecasted METOC values was <4 dB compared to a mean RMS error of <3 dB from the in situ measurement derived prop loss predictions. Significantly larger errors occurred at the COAMPS analysis times. Overall, the results are very promising for this trade wind region, where the air is cooler than the relatively warm sea surface.

KEYWORDS: Rf Propagation, Boundary Layer, Refractivity, Bulk, COAMPS, APM, RED, Evaporation Duct